TECH OFFER

# Chilled Water and Condenser Filtration System Enhancing Efficiency & Water Quality

## KEY INFORMATION

TECHNOLOGY CATEGORY:
Green Building - Heating, Ventilation & Air-conditioning
Environment, Clean Air & Water - Sanitisation
Sustainability - Low Carbon Economy

TECHNOLOGY READINESS LEVEL (TRL): TRL9
COUNTRY: SINGAPORE
ID NUMBER: TO175479

## OVERVIEW

Conventional building central cooling plants, comprising water-cooled chillers, air handling units (AHUs), cooling towers, and pumps, often suffer fouling issues caused by accumulation of suspended solids in the micron range, such as rust and corrosion scale, as well as dissolved minerals within the chilled water closed loop system. Over time, these impurities clog strainers and nozzles, foul heat exchangers, and impair heat transfer efficiency, resulting in turbid water and reduced cooling performance. In condenser water open loop systems, untreated or ineffectively treated water further cause abrasion and leakage in condenser copper tubes, leading to system downtime and costly maintenance.

To address these challenges, this invention introduces an effective and energy-efficient cleaning and filtration system that continuously filters blackish and rusty chilled water, returning cleaner and clearer water to the chilled water closed loop system. By leveraging existing water pressure without requiring an external pump or additional electricity, the system restores water clarity and operational efficiency, leading to:

- Reduced cooling energy consumption
- Enhanced occupant comfort and wellbeing
- Significant reduction in water usage for system cleaning
- Lower operational costs, carbon footprint, and emissions
- Alignment with the “Go 25°C” National Movement led by the Singapore Green Building Council (SGBC)

The technology owner seeks collaboration with building owners, facility managers, main contractors, chiller and cooling tower manufacturers and suppliers, and energy service companies (ESCOs) to explore integration in new developments and retrofit applications.

## TECHNOLOGY FEATURES & SPECIFICATIONS

- **Dual Cleaning Capability:** One system can clean up to 5 chillers and 1 chilled water closed loop circuit. Another system can clean up to 5 cooling towers and 1 condenser water open loop circuit
- **Continuous Microfiltration:** Continuously draws 5–10% of water from the loop to remove suspended solids and dissolved impurities, returning filtered water to the system
- **No Additional Power Consumption:** Operates without a dedicated pump or electricity
- **Low Water Use:** Requires only 5% of system water for cleaning, much less than conventional methods that replace most of the water
- **Enhanced Cooling Efficiency:** Enables a higher chilled water set point (e.g., from 6°C to 10°C) while maintaining comfort, resulting in significant energy savings
- **Compact Design:** Minimal installation footprint of 2m (L) × 2m (W) × 2m (H)
- **Zero Downtime:** easy to install without disrupting existing building operations

## POTENTIAL APPLICATIONS

The technology is applicable to both new installations and retrofit projects involving chilled water and condenser water systems, such as cooling tower open loop and chilled water closed loop circuits.

Potential application scenarios include, but are not limited to:

- Commercial buildings
- Government facilities
- Shopping malls and hotels
- Data centres
- Educational institutions (e.g. schools, junior colleges, polytechnics, universities)
- Hospitals and healthcare facilities
- Industrial facilities and factories
- Equipment and systems using water for cooling or heating

## UNIQUE VALUE PROPOSITION

- **Application Versatility:** Each system can handle multiple chillers or cooling towers
- **Green Operation:** Requires no electricity for filtration, reducing energy consumption and supporting sustainability goals
- **Fast ROI:** Payback period of less than 12 months through energy and maintenance savings.

- **Significant Energy Savings:** Enhances cooling efficiency and lowers electricity use and operating costs